

■ 1.0 Project Work Plan

1.1 Introduction

The Cambridge Systematics, Inc. team (CS team) is pleased to submit a proposal for the Interstate 40 Regional Transportation Profile (I-40 Profile). We believe that our team and proposed approach will produce a study for the Arizona Department of Transportation (ADOT) and partner agencies that clearly identifies the transportation system needs, deficiencies, and potential project solutions for this important interstate corridor and its surrounding communities in the region. The transportation system evaluations also are intended to maintain the performance goals and objectives of the Arizona Long-Range Transportation Plan (MoveAZ), to be consistent with the profile guidelines developed as part of the Southeastern Regional Transportation Profile (Southeast Profile), and to meet the regional transportation system needs of ADOT and its partner agencies.

The I-40 Profile is unique among the current set of profiles being conducted by AODT. It is focused exclusively on a single roadway corridor. This corridor not only provides east-to-west connectivity within the northern portion of the State, it also connects Arizona to important destinations throughout the southwestern United States and beyond. Interstate 40 serves many different traveler segments including long-haul heavy duty trucks, long-distance passenger autos, and regional and local auto and truck traffic. The linear nature of the study area presents special demands and challenges, from data analysis methods to public outreach to documentation and distribution of findings. As with the numerous other plans that the CS team has developed for ADOT, the I-40 Profile needs to be broadly inclusive of corridor users, residents and business owners, as the proposed infrastructure solutions and projects will help shape and stimulate growth in the region for many years to come.

Team Overview

To ensure that the complex blend of technical and procedural challenges can be met in this study, we have formed a team that combines national and Arizona-specific experience in the areas of interest to ADOT, including:

- Over 20 years of HERS-ST analysis and evaluation experience for highway system planning in Arizona and other states;
- History of developing integrated highway and multimodal plans, evaluating capital, operational, and intelligent transportation systems (ITS) solutions in corridor settings;
- Familiarity with the transportation planning efforts in the region and the specific issues to be addressed, including system maintenance and preservation, operational considerations, land use and development patterns, goods movement, and more;
- Expertise in designing and applying practical performance-based system evaluations, including MoveAZ and ADOT's RTP guidelines;
- Development of analytical tools and software applications to efficiently assess needs and project in transportation asset classes such as pavement, bridge, and interchanges;

- Quantitative assessment of the impacts and benefits of transportation system improvements that affect regional goods movement and trade flows;
- Development and implementation of GIS-based socioeconomic, land use, and travel models to support regional and state transportation planning;
- Design of public and stakeholder outreach and involvement programs tailored to the specific concerns of Arizona and the many, varied communities along the I-40 corridor; and
- Ability to immediately commit senior staff with relevant experience to direct and manage the project and work directly with ADOT management and staff.

We believe that the CS team assembled to develop the I-40 Profile combines the optimal balance of national expertise and local experience in corridor planning and public outreach to meet the needs of ADOT and its partner agencies. Our team includes CS; DMJM Harris, Inc.; and Intrinsic Consulting, LLC. CS has a long working relationship with DMJM Harris and is pleased also to include on our team Intrinsic Consulting, one of the most respected public involvement firms in Northern Arizona. All of the proposed key team members have extensive experience in transportation system planning within the state of Arizona, and are intimately familiar with the requirements of the Regional Transportation Profile development process.

Our proposed team includes:

- **Cambridge Systematics.** CS has conducted numerous studies for ADOT, including MoveAZ, the Williams Gateway Corridor Definition Study, and the Southeast Regional Transportation Profile. CS is nationally recognized for providing high quality multimodal transportation planning. CS was the original developer of HERS-ST and has developed numerous sketch planning tools to support transportation planning.
- **DMJM Harris.** DMJM Harris and CS have worked closely together on a number of projects, including several in Arizona. DMJM Harris supported CS on the feasibility analysis for the Williams Gateway Corridor Definition Study. DMJM Harris has recently conducted SR 179 Needs Based Implementation Plan, Access Management Plan and Corridor Management Plan, and the East Flagstaff Traffic Interchange Environmental Assessment and Final Design in Northern Arizona. CS is currently supporting DMJM Harris on the I-10 South DCR (I-8 to Marana). For the I-40 Profile, DMJM Harris will be responsible for leading the analysis of existing and future conditions (Task 2) and providing support as called for in all other tasks.
- **Intrinsic Consulting.** Intrinsic's position as the preeminent public involvement firm in Northern Arizona completes the line-up of necessary skills for this project. We believe that Intrinsic brings extensive knowledge of the study area and, in particular, of specific community groups that we will need to reach in order to conduct an effective public involvement process. Intrinsic also has an excellent working relationship with the ADOT Districts in Northern Arizona, which will be beneficial for this study. Intrinsic will lead the public and stakeholder outreach effort (Tasks 3 and 5) including identifying participants, scheduling meetings, and facilitating public events.

Study Understanding

I-40 is a major transcontinental transportation corridor, 2,555 miles long from Barstow, California to Wilmington, North Carolina. Just under 360 of these miles are within Arizona, making it the State's second longest Interstate highway. There are 82 traffic interchanges along I-40, including the recently reconstructed system interchange with I-17 in Flagstaff. I-40 intersects

many other state highways and traverses five counties, two national forests, one national park, and the Navajo Indian Reservation.

The previous ADOT Corridor Profile Studies, implemented since the completion of the now-superseded 1994 Arizona Transportation Plan, focused on specific corridors. The Regional Transportation Profiles currently underway are being implemented with a broader regional focus to address both corridor needs and larger system-level considerations. The previous Corridor Profiles used a variety of evaluation methods to identify transportation needs, deficiencies, and project improvements, therefore producing inconsistent analyses or incompatible outcomes. Additionally, issues important to the regional and state transportation system, such as connectivity, mobility, accessibility, safety, economic competitiveness, and trade, were often not addressed in the planning process because of the corridor focus.

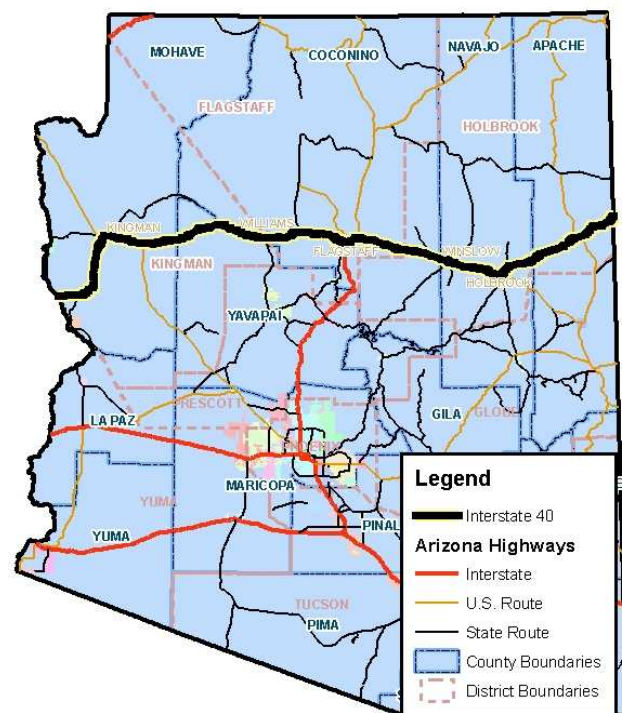
The I-40 Profile is the only regional transportation profile planned for this round of profiles that addresses a single route. In this way, its focus is both narrower than the other profiles but also more general. I-40 is truly a *statewide* route of major significance, crossing the entire state and carrying a large volume of freight across its entire distance. Though other routes, such as I-10, also serve these purposes, they also link major population centers (i.e., Phoenix and Tucson) while I-40 primarily serves statewide and interstate purposes. Figure 1.1 illustrates the I-40 Profile study corridor in relation to surrounding counties and state highways.

The shift from corridor profiles to regional profiles also allows ADOT to expand planning to smaller and less-traveled routes that were otherwise skipped in the planning process. For the I-40 Profile, most other state routes that touch on the Interstate are covered by another profile. However, it will be important to coordinate with these other profiles and ensure consistency within the solutions identified. The I-40 Profile will also address business routes adjacent to I-40.

ADOT faces mounting challenges to maintaining and expanding a transportation system that can serve the needs of its growing population while also coping with the reality of externally-imposed factors such as increasing long-distance heavy truck travel. These challenges need to be met through new and innovative methods and strategies. The CS team will conduct the I-40 Profile to address the following key issues:

- **Application of consistent ADOT guidelines.** The I-40 Profile will use the evaluation process guidelines developed as part of the Southeast Profile, but must also take into consideration some of the statewide issues that might be lost in the regional emphasis. As with all of the other Profiles, highway system needs for the I-40 Profile will be based on evaluations

Figure 1.1 I-40 Profile Study Corridor



using HERS-ST AZ as specified in the ADOT guidelines. Due to the nature of this Profile and the age of many sections of the facility (I-40 is Arizona's oldest Interstate), additional emphasis will be placed on evaluating the operational, maintenance, and preservation needs across the entire length of the facility.

- **System performance.** As required by state legislation, ADOT developed the MoveAZ Plan to identify the capital projects that best improve the performance of the state transportation system. Following the profile guidelines, ADOT will continue to deliver plans that are performance-based, meet state legislation requirements, and provide consistency in planning and programming.
- **Economics and cost-effectiveness.** An opportunity to link transportation system improvements with economic considerations will be important to ADOT, given likely state and Federal funding constraints. Transportation facilities often play a key role in economic development. Applying tools such as HERS-ST provides ADOT an opportunity to understand these linkages and to identify cost-effective solutions.
- **Transportation asset management and analysis.** The I-40 Profile will address preservation, maintenance, and design strategies in addition to capital projects (modernization and expansion). ADOT uses a suite of management systems that help identify deficiencies and evaluate potential projects for issues such as pavement and bridge conditions, safety concerns, and others. It will be important to work with ADOT's subprogram managers and district engineers to identify needs and deficiencies and evaluate solutions for key transportation assets.
- **Agency, stakeholder, and public partnerships.** Both the technical procedures and stakeholder/public involvement features of the Profiles will be developed for the long-term with an emphasis on consistency and user-friendliness for continued application. This process will provide an opportunity for ADOT to strengthen relationships with the metropolitan planning organizations (FMPO), councils of governments (NACOG and WACOG), and county, local, and tribal governments that are partners in the region crossed by I-40.

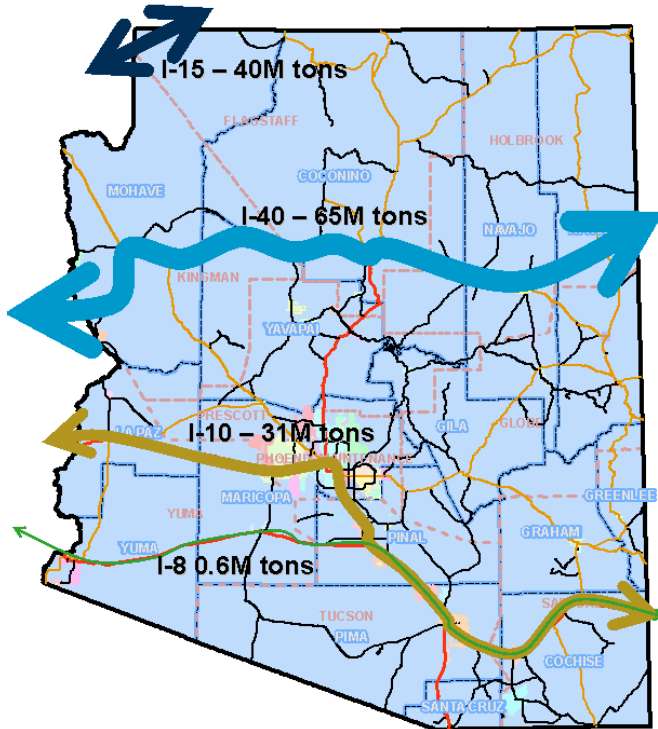
1.2 Overview of Approach

The CS team has developed an approach for the I-40 Profile that is consistent with ADOT's Profile Guidelines. Our proposal also recognizes the unique emphasis of the I-40 Profile on a specific corridor. In the shift to regional transportation profiles, ADOT has shifted from a corridor evaluation to a regional evaluation. Although I-40 alone retains the corridor emphasis, the I-40 Profile needs to consider a broader range of regional issues and transportation system effects than were included in earlier corridor profiles.

Our evaluation framework will build off of available data and analysis tools to prepare an accurate description of population, economic, land use growth; passenger and freight travel demand; existing and future transportation system conditions; and transportation system needs and deficiencies. The ultimate product of this process will be a cost-effective assessment and prioritization of projects that best meet the transportation system performance needs of ADOT and the communities along corridor. The analysis will be performance-based, the foundation of which will include local and regional issues, HERS-ST and other analytical tools to assess cost-effectiveness, and remain consistent with the performance-based planning process begun as part of the MoveAZ Plan. Projects will be identified for more detailed analysis and potential inclusion in the update of the next state transportation plan.

The CS team's approach and detailed work plan for the I-40 Profile centers on several key issues, including:

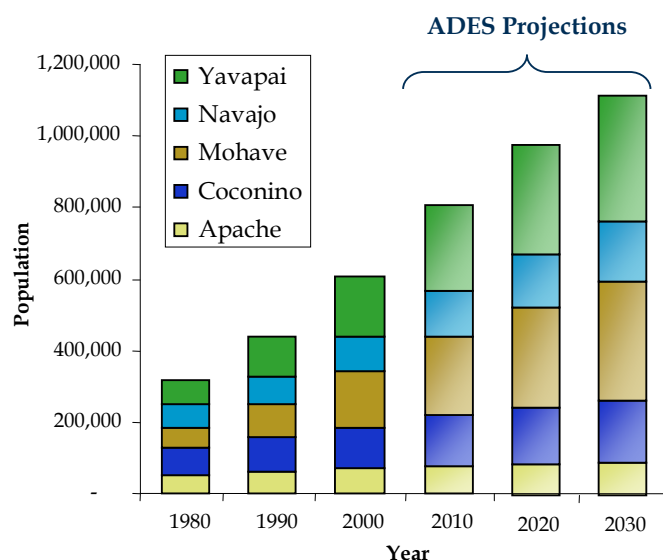
Figure 1.2 Major Through Freight Flows in Arizona, 2003



- **Focus on specific state transportation system corridors and routes** - I-40 crosses the entire State of Arizona and is 359 miles long. In addition, there are several segments of business routes remaining in cities along I-40 from the construction of the road. The business routes may have particular issues with roadway geometry, facility condition, railroad crossings, and other related issues. ADOT's current five-year program contains a 5.6-mile turnback project in Winslow that includes reconstruction of streets, curbs, and sidewalks before route transfer.

- **Freight and goods movement.** I-40 carries the greatest volume of through truck movements in the state (Figure 1.2). The parallel Burlington Northern-Santa Fe (BNSF) railroad also transports considerable goods through Arizona. Recent studies have considered potential intermodal facilities along the I-40 corridor to stimulate economic development in the region, yet very little of the current freight traffic along I-40 or the BNSF lines is actually destined for Arizona. An understanding of the underlying commodity flows and industry trends is necessary to effectively assess the promise of various projects and strategies such as these.

Figure 1.3 Northern Arizona Historic and Projected Population Growth



- **Population and employment growth.** Arizona has been growing rapidly for many years, creating the need to proactively plan for future corridors and systems that are interconnected and that address regional as well as state transportation needs and solutions. However, population growth has not been uniform. Among the five counties touched by I-40, Yavapai and Mohave Counties have grown rapidly (more than doubling over the last two decades) and are expected to continue to grow

the fastest into the future (Figure 1.3). Other parts of Northern Arizona have also grown, albeit at a slower rate. The I-40 profile needs to identify appropriate solutions for both high- and low-growth areas of the State. For I-40, the different communities around the region will influence short trip making, long distance trip making, and different markets using the roadway that impact needs, deficiencies, and potential solutions.

- **Preservation and Interchanges.** The I-40 Profile will build upon the guidelines to address issues that are especially significant for the corridors, including pavement preservation and interchange deficiencies. The CS team's approach will consider the development and application of performance-based analytical tools that support the procedures identified in the ADOT guidelines and that augment the needs and deficiencies analysis as well. For example, the CS team will introduce more rigorous analysis to better assess and identify needs and potential project solutions that address:
 - Obsolete and dangerous design features of older facility segments;
 - Deteriorating traffic interchange configurations;
 - Pavement and bridge serviceability, preservation, and maintenance;
 - Effective intermodal connections with transit systems and freight infrastructure; and
 - Local, regional, and long-distance needs and impacts of trucks and autos on the facility.
- **Coordination with other profiles.** The I-40 Profile will touch six other ADOT Regional Transportation Profiles that are either currently underway or planned for the next several years. We propose to have explicit coordination meetings with ADOT and consultant staff for these profiles to ensure consistency of approach and goals.
- **Implementation of an inclusive public and stakeholder involvement program.** The public and stakeholder involvement process should engage partners and stakeholders in building consensus on regional needs, as well as project strategies, providing legitimacy to the planning process.

1.3 Work Plan

Task 1. Refine Work Plan and Develop Evaluation Framework

Objective

Refine the work plan, schedule, and budget, and prepare a project management plan, public and stakeholder involvement process, and evaluation framework.

Approach

The CS team will refine the I-40 Profile work plan, including the schedule and budget for all tasks, to ensure that the objectives of ADOT and the Technical Advisory Committee (TAC) will be met. ADOT has identified a TAC that will provide information to the CS team, help coordinate with local stakeholders, and review deliverables. This body is comprised of the local jurisdictions, tribes, and agencies that are impacted by the corridor. The CS team will conduct a regular set of meetings with this group, scheduled around deliverables. Proposed meetings will include at least:

- A kickoff meeting, held early in the study to resolve any technical and institutional issues that may impact the preparation and schedule of the study;

- A meeting to discuss existing and future conditions and to present a proposal for the first round of public involvement;
- A meeting to discuss the results of the first round of public involvement and the needs analysis;
- A meeting to discuss preliminary findings from the analysis of proposed projects and to present the proposal for the second round of public involvement; and
- A final meeting to discuss the results of the second round of public involvement and final project prioritization.

Additional meetings may be conducted as deemed necessary by the ADOT project manager and the CS team. We propose to hold meetings at multiple locations in the corridor, with the majority of meetings to be held in a central location (likely Flagstaff) to minimize travel time for all participants.

The CS team will design a public and stakeholder involvement process, including identifying events for all rounds of public involvement, newsletters, media activities, and contact lists. This plan will be prepared at this early stage to ensure that active public and stakeholder involvement is underway from the start of the study and that the appropriate level of stakeholder input is obtained for use in the study's planning process. Detailed public and stakeholder procedures are presented in Tasks 4 and 6.

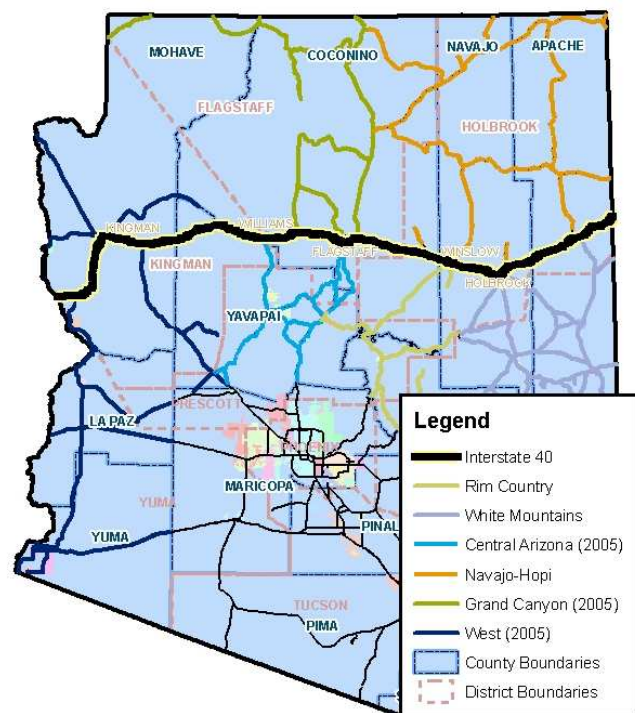
The CS team will develop a project management plan and supporting quality control (QC) plan to meet the specific needs of this study. By following the procedures in these plans, many problems will be avoided altogether, and others will be caught and rectified before they become serious. Adhering to the study's schedule requires this type of approach. Our QC planning process will include clearly defined management and team roles, structured milestone meetings and deliverables, status updates and monitoring, ongoing technical review, and a document control system similar to the one we developed for MoveAZ.

Profile Coordination Meetings

The CS team recognizes that the I-40 Profile intersects several additional Regional Transportation Profiles in Northern Arizona (Figure 1.4). There are three ongoing (Grand Canyon, Central Arizona, and West) and three planned (Rim, White Mountains, and Navajo-Hopi) that touch the I-40 Profile.

The CS team proposes to hold explicit coordination meetings with ADOT staff and the consultants for these profiles to ensure consistency of approach, data, and tools. These meetings could either be with all consultants or with individual consultants to address issues specific to an

Figure 1.4 Connections To Other Profiles



individual profile. For example, there may be issues specific to interchanges in urban issues (i.e., I-40 and U.S. 93 in Kingman or I-40 and I-17 in Flagstaff) that necessitate a meeting with a specific subset of consultants.

The CS team will work with ADOT to identify the appropriate times for coordination meetings. The most important meeting would likely be to coordinate socioeconomic, land use, and transportation data that form the foundation of the Profile studies. Other potential meetings could include discussion of public involvement meetings (especially if meetings were held within a short time of one another), and prior to the presentation of needs and deficiencies or project solutions.

Subtasks

- 1.1 Prepare the study's project management plan and QC plan that provides ADOT with up-to-date tracking of technical work status, schedule, and budget adherence;
- 1.2 Conduct a kickoff meeting with ADOT and the TAC to better understand their perspectives on critical issues and to review the project work plan and schedule;
- 1.3 Refine the project work plan, schedule, and budget based on the comments from ADOT and the TAC;
- 1.4 Design the public and stakeholder involvement plan to meet the needs of ADOT and the TAC for this study; and
- 1.5 Conduct coordination meetings with ADOT and consultant staff for Profiles that overlap the I-40 Profile.

Products

- Final work plan, schedule, and staff requirements (budget) for the study;
- Project management, QC, and schedule adherence plan; and
- Final public and stakeholder involvement plan.

Task 2. Describe Existing and Future Conditions

Objective

Compile available information, data, and tools to describe existing and future conditions in the study area. Document existing and future conditions in Working Paper 1.

Approach

The CS team's approach to existing and future conditions is based on a thorough process to identify all available data at the state, regional, and local level. It includes a review of existing studies in the area, identification of existing conditions, development of travel demand estimates, and projection of future conditions.

Review Existing Studies

The CS team will begin the existing and future conditions analysis with a review of all available ADOT and local transportation and related studies pertaining to the I-40 corridor. Relevant studies to be reviewed include:

- **ADOT.** MoveAZ, the existing I-40 Corridor Profile, interchange studies, working papers from ongoing Profiles, and other relevant studies identified by the ADOT project manager, district engineers, and the TAC. The current ADOT five-year construction program will also be reviewed.
- **County and local.** Transportation planning documents conducted by cities, counties, regional agencies, and tribes in Northern Arizona. General plans and other land use plans generated at any level of government will also be reviewed. Specific modal and/or inter-modal studies (e.g., NACOG/FMPO I-40 Freight Port Study, 2004).
- **Other agencies.** Other state agencies, such as State Lands, Commerce, and Economic Security, that have developed plans that address transportation, socioeconomic, or other related issues in Northern Arizona will also be reviewed.

The CS team will focus its efforts on plans conducted within the last 10 years. The CS team will summarize the purpose, findings, and recommendations of each study. The CS team will also collect and tabulate information on all transportation improvements within one-half mile of the I-40 centerline, programmed for the next five years by ADOT, local jurisdictions and COGs/MPOs.

Existing Conditions

The CS team will compile an overview of land uses, roadway conditions, travel data, crash history, traffic operations, access management, multimodal and alternative mode activities, socioeconomic conditions, and environmental regulatory requirements in sufficient detail that near-term route needs and deficiencies can be identified. Existing conditions data will be drawn from databases maintained by Federal, state, regional, and local agencies and completed and ongoing studies. A windshield surveys of the I-40 corridor will be conducted to confirm information obtained elsewhere, but limited supplemental field data collection is anticipated for this task. Existing conditions and route-specific needs and deficiencies will be documented in Working Paper 1. The CS team will use GIS as the principal clearinghouse for all data.

Land use information will be collected for those developments that impact state highway traffic operations and therefore may extend beyond the area immediately adjacent to the corridors. Socioeconomic data will be compiled for the entire region. Land use and socioeconomic inventory activities in this task will include:

- **Land ownership.** The CS team will inventory land ownership within one-half mile of the I-40 centerline, identifying private landowners as well as areas under the control of the Arizona State Land Department, U.S. Bureau of Land Management, and other public entities. GIS and other data from Federal, state and local agencies will be used to identify and map generalized land use patterns within one-half mile of the I-40 centerline.
- **General plans.** The CS team will research municipal General Plans and county Comprehensive Plans to identify and map designated future land uses within one-half mile of the I-40 centerline, where this information is available. This information may extend beyond the one-half mile boundary if land uses outside that area impact the corridor. As part of the stakeholder meetings, the CS team will meet with planning staff of jurisdictions along the corridor to identify current, planned, and proposed residential or commercial developments likely to have a significant affect on traffic within the corridor or at specific interchanges.
- **Socioeconomic data.** The CS team will obtain and document the latest available population and employment estimates, as well as 2015 and 2030 projections, for all cities and counties

along the corridor. Sources will include the Arizona Department of Economic Security, local chambers of commerce and the Arizona Department of Commerce, WACOG, NACOG, and FMPO. Private data sources, such as Woods & Poole are available to the CS team to supplement publicly available data.

- **Environmental justice.** In consultation with ADOT staff, the CS team will define the boundaries of target areas in the corridor for assessing potential impacts to Environmental Justice (EJ) population groups. It is expected that these areas will lie within Census-designated “places” or population centers (whether incorporated or not) and the portion of the corridor traversing the Navajo Nation. Census data will be used to identify the number and proportion of each EJ population group within designated target areas (likely Census Tracts). EJ populations include designated minority groups; senior citizens, persons with specified types of disability (work, self-care, and mobility); low-income households; and female-headed households with children.

One the key goals of Working Paper 1 will be to document information about highway system conditions. Highway data to be collected includes:

- **HPMS.** The Highway Performance Monitoring System (HPMS) forms the backbone for the analysis of data. ADOT is in the process of cleaning and updating HPMS data that will be used for the I-40 Profile. HPMS data is used by HERS-ST AZ to conduct the needs and deficiency analyses. The CS team will also generate a version of the HPMS data accounts of committed projects in the study area.
- **Traffic counts.** The CS team will use existing ADOT traffic counts to support the analysis existing conditions for the I-40 Profile. In consultation with ADOT staff, the CS team will apply accepted ADOT methods to adjust raw traffic counts as appropriate, based on seasonal and weekly variations in traffic volume. At this time no additional traffic counts are expected as part of the study.
- **Interchanges.** The CS team will map the locations and geometric characteristics of all existing traffic interchanges and grade separations, including any designated wildlife crossings. The interchange data will be used with tools to help identify interchange needs and deficiencies in Task 3.
- **Crash data.** The CS team will obtain crash records from ADOT Traffic Records for the most recent available five-year period. The distribution of crashes will be mapped, tabulated, and summarized by location, severity, manner of collision, light and weather conditions, and motorist violation/impairment. Ramp crashes will be analyzed separately from mainline incidents.
- **Pavement conditions.** The CS team will tabulate and map the current ADOT data on mainline pavement condition. This will include data on shoulder width and conditions and pay specific attention to concerns about the subgrade on I-40.
- **Bridge and structure condition.** The CS team will map the location of structures along the I-40 mainline and report all available information on their condition, including which structures are functionally obsolete or structurally deficient. ADOT’s national bridge inventory submittal will be used to identify bridge conditions on I-40.
- **Curves and grades.** The CS team will document and map significant horizontal grades and vertical curves along the mainline, consulting ADOT as-built plans, as necessary.

- **Roadside features.** The CS team will inventory and map roadside rest areas, including obsolete facilities slated for closure, as well as planned new rest areas. Existing Intelligent Transportation Systems (ITS) will also be identified within the corridor. Finally, the Ports of Entry at either border will also be evaluated.

The CS team will also collect and compile available data on multimodal transportation facilities in the corridor, including:

- **Burlington Northern Santa Fe Railroad.** Information from sources the Federal Railroad Administration, Arizona Corporation Commission and ADOT studies on track conditions, facilities (yards, freight depots, intermodal facilities), and grade crossings within one-half mile of the I-40 mainline will be identified. The volume of trains and types of freight carried will also be identified from sources such as the Department of Commerce Trade and Logistics Study, waybill data, and other sources.
- **Transit and rail.** Rail passenger service frequencies, stations and passenger volumes will be identified for the Amtrak Southwest Chief and Grand Canyon Railway. The CS team will identify intercity bus operators (i.e., Greyhound) current routes and schedules within the corridor. Estimates of utilization of these services will be generated using methods developed for MoveAZ. The CS team will also identify existing on-demand transit supported by Federal 5310 and 5311 programs.
- **Bicycle/Pedestrian.** The CS team will identify the suitability of I-40 for bicycles where appropriate, including adequacy of shoulder widths. Existing bikeways or bike routes crossing I-40. Existing interchanges where bicycle or pedestrian crossing of I-40 is hindered by circuitous routing, unfavorable intersection conditions, ADA deficiencies, and other sources will also be identified.
- **Pipelines.** The CS team will identify locations of pipelines within or crossing the I-40 corridor.

Finally, the CS team will prepare a brief, descriptive overview of the physical, natural, and cultural environment within one-half mile of the I-40 centerline, including:

- **Physical.** The CS team will map the generalized topography; landforms and geological character; visual resources and notable elements of the landscape; prime or unique farmland; any active, inactive, or closed hazardous materials sites; and corridor locations in non-conformity with National Ambient Air Quality Standards.
- **Natural.** The CS team will identify biotic communities (characteristic plant and animal life along the corridor), potential rare, endangered or special status species that might occur in the corridor, wetlands, water resources (including Waters of the United States that may necessitate a Clean Water Act Section 404 permit, Section 4(f) or 6(f) properties, and any specially designated areas such wildlife refuges, cooperative management areas, or areas of critical environmental concern.
- **Cultural.** The CS team will identify Known or potential cultural, archaeological or historic sites (Federal law precludes protected resources from being mapped).
- **Animal crossings and dangerous areas.** Elk are a known problem all the way from Ash Fork to Twin Arrows and crashes involving Elk have created legal issues for ADOT. Locations of elk hits are available from Dennis Kiefer of the Flagstaff District.

Future Conditions

The CS team will compile a summary of future conditions to support identification of potential deficiencies for the state highway system. This task is intended to provide an overview of future land uses, programmed/planned roadway improvements, travel demand volumes, traffic operations, access management, multimodal and alternative mode needs, and socioeconomic conditions for 2030. All future conditions data resulting from this task will be included in Working Paper 1.

As with the existing conditions analysis, GIS will serve as the primary analysis tool. Major analyses and activities will include the following:

- Programmed/planned roadway improvements will be identified from the ADOT Five-Year Construction Program and Transportation Improvement Programs from regional agencies (NACOG, WACOG, FMPO), Counties (Apache, Coconino, Mohave, Navajo, and Yavapai), local jurisdictions (Flagstaff, Holbrook, Kingman, Williams, and Winslow), and the Navajo Indian Reservation.
- Traffic operations will be determined along the corridors based on 2030 conditions. This analysis will include the projected travel demand volumes and the programmed/planned roadway improvements. Updated travel forecasts will be used to support this analysis. Level of service will be documented for corridor segments and major interchanges, especially system-to-system interchanges. Locations in which level of service is determined to be unacceptable will be identified.
- Multimodal, ITS, operational, and alternative mode needs will be determined along the corridors. The future needs assessment will be based on planned expansion of current operations, historic use of existing alternative mode facilities, and overall trends in multimodal travel and ITS and operational strategy deployments.
- Socioeconomic conditions for future years will be evaluated both for the purpose of describing the intensity of existing and anticipated future development. A description of future development will be achieved by creating thematic maps.

Travel Demand Estimates

The Profile Guidelines identify a variety of approaches that can be used to estimate travel demand. The CS team recommends using the most straightforward of these approaches for the overall estimation of future traffic volumes – the link factoring approach – with some useful additions. A travel model is not appropriate for this study, because much of the I-40 corridor is rural in nature and the model would be of limited future use unless it incorporated a significantly greater area. Link factoring uses estimates of future population and employment to generate future travel demand forecasts and allocates these to the roadway system based on available data.

This approach will be supplemented by examining multiple travel markets:

- **Local trips.** Local trips along I-40 can be estimated using the link-factoring approach described above. These trips are generated by the local population and employment base. This analysis will be supplemented with results from the FMPO model.
- **Long-haul truck.** Most of the truck traffic on I-40 is for through movements and does not have an Arizona origin or destination. As a result, the link factoring approach is not

suitable for estimating growth in this segment, which is not driven by the local population or economy. The CS team will estimate truck volumes separately using work we have completed for the Department of Commerce as well as information on port activity and growth in Southern California and Texas. CS has extensive experience working on freight issues in these two states and has information readily available on expected growth.

- **Long-distance auto.** Tourist traffic along I-40 is also impacted by sources other than the local population and employment. The CS team will use available resources, such as Grand Canyon visitation patterns, to estimate a trend in long-distance automobile travel along segments of I-40.

GIS Data Management

A key requirement for this task is the effective compilation and management of information on existing and future conditions. Considering the number of potential sources of available data from multiple agencies and the data that will be need to be analyzed for nearly 360 miles of state highways, the management of information will be crucial to the timeliness and efficiency of the study. The CS team will store information collected and created during the course of the study in a GIS. This GIS will be integrated with the evaluation framework and the modeling process to better understand travel demand impacts associated with needs/deficiencies and evaluations to be conducted later in Tasks 3 and 5.

Subtasks

- 2.1 Prepare an inventory and GIS database of existing information to be used to perform an analysis of existing transportation conditions;
- 2.2 Prepare a similar inventory, GIS database, and analysis of future (no project) transportation conditions;
- 2.3 Develop existing and future HPMS base data to support analysis of deficiencies in Task 3. The future data will include all projects in the current ADOT five-year program to support analysis of conditions in 2015 and 2030; and
- 2.4 Develop travel demand estimates for the I-40 corridor by market type (long-haul truck, long-distance auto, and local trips) and integrate with ADOT HPMS data.

Products

- Existing and future conditions GIS data layers and presentation material; and
- Working Paper 1, Existing and Future Corridor Conditions.

Task 3. Identify Future Needs and Deficiencies

Objective

Using the existing and future transportation conditions, identify needs and deficiencies for 2015 and 2030 in the region and each corridor, and identify opportunities and issues for discussion with ADOT and at public involvement events. Document needs and deficiencies in Working Paper 2.

Approach

The CS team will develop a framework to identify needs and deficiencies in the region. This process will be driven primarily by HERS-ST AZ, an economic analysis tool that uses HPMS data and engineering standards to identify deficiencies on the transportation system, as well as potential solutions. The power of HERS-ST AZ derives from the extensive engineering research built into the program's algorithms. The needs and deficiency analysis will also use additional tools and methods to capture non-highway and operational deficiencies and to address several issues that are of specific concern in the I-40 corridor, including interchange areas and pavement preservation.

Using HERS-ST AZ

The CS team has extensive experience using HERS-ST in Arizona and across the U.S. CS developed HERS-ST AZ as part of the Southeast Arizona Profile to support all eleven Profiles planned by ADOT. The CS team will take full advantage of all of HERS-ST AZ capabilities, including:

- **Sample vs. universe.** As required, the CS team will make full use of the universe of HPMS data records on I-40 and adjacent state routes. The CS team will adjust the Arizona HPMS data to ensure recognition of all HPMS highway segments.
- **Travel demand.** As part of Task 2, the CS team will be updating travel demand estimates along the I-40 corridor. These estimates will take into account the various markets served by I-40, including through freight, through and tourist oriented automobile, and local trips. Updated data will be mapped to the HPMS roadway segments using the process developed as part of MoveAZ, including smoothing the data at urban area boundaries and updating truck growth rates to ensure that the base and future traffic volumes are as accurate as possible.
- **Crash rates.** HERS-ST predicts crash rates using algorithms that capture traffic volumes, roadway geometrics, and other factors. These rates are based primarily on national research across a wide variety of conditions. The CS team will calibrate these rates to observed rates in the I-40 corridor. This will ensure that predicted crashes reflect local conditions.
- **Existing plus committed data.** The HPMS data used to support future deficiency analysis will include existing and committed projects. Committed projects include projects that are set for funding in the current ADOT Five-Year Transportation Facilities Construction Program. This will be built off the most current program (likely 2006 to 2011).

Deficiency Evaluation Framework

The CS team will develop a deficiency evaluation framework that uses HERS-ST AZ as its base. The CS team will supplement the HERS-ST AZ analysis with tools to examine relevant operational, preservation, maintenance, interchange, and intermodal deficiencies to help ADOT capture the wide range of activities that affect the state highway system. The methods used for these analyses represent best industry practice, using tools and data available to ADOT and the CS team through similar work conducted in other states. Table 1.1 outlines several key types of investments made by ADOT, the types of issues these investments cover and potential tools that can be used to help evaluate these investments.

Table 1.1 Deficiency Areas for Evaluation

Program	Examples	Potential Tools
Preservation	<ul style="list-style-type: none"> • Resurfacing, rehabilitating, and replacing roadways • Bridge maintenance, rehabilitation, and replacement 	<ul style="list-style-type: none"> • HERS-ST • ADOT Pavement and Bridge Management Systems
Modernization	<ul style="list-style-type: none"> • Improving existing facilities • Capital expansion • Interchange upgrades 	<ul style="list-style-type: none"> • HERS-ST • Interchange analysis tools
Operations	<ul style="list-style-type: none"> • ITS and related deployments, • Crash rates and costs • User costs (out of pocket, pollution) 	<ul style="list-style-type: none"> • IDAS • HERS-ST
Multimodal	<ul style="list-style-type: none"> • Transit • Rail • Bicycle/pedestrian 	<ul style="list-style-type: none"> • Local plans • ADOT Bike/Ped Plan

We believe that this framework should also be closely tied to the performance-based planning framework develop for MoveAZ. Though the measures and tools may not be the same, the general planning factors (mobility, safety, reliability, environmental protection, accessibility, and economic vitality) will all be addressed in this framework. The integration of local issues into the evaluation process will also be an important element of the I-40 Profile and could include qualitative as well as other quantitative tools and measures. We will identify and address key regional deficiencies and issues that the team is aware of and tools required to fully assess transportation deficiencies.

Pavement Preservation

I-40 is an aging roadway, many stretches of which are outdated. It was built in the late 1960s and early 1970s to accommodate a different mix of traffic than it carries today. Its truck volumes are among the highest in the state, outside the large metro areas and the I-10 Phoenix-Tucson corridor. In some areas, the pavement and subgrade require reconstruction to handle truck loads. Heavy vehicles put more pressure on the highway, resulting in earlier pavement failures and winter operations problems.

The CS team will use available information from ADOT's pavement management system to evaluate the need for reconstruction of the roadway. The analysis will take into account both the operational costs and long term life-cycle costs associated with this significant undertaking. For example, the poor roadway condition may require more frequent surface treatments that drive up the long-term costs of pavement preservation.

Interchange Analysis

Because of the age of the roadway, many of the interchanges along I-40 are functionally inadequate, or will be inadequate to accommodate future traffic volumes. This is especially true in the urban areas (Kingman, Williams, Flagstaff, Winslow). Although a small community, Williams has great importance as a gateway to the Grand Canyon. Many of the interchanges in the Flagstaff district, especially west of Williams to Ash Fork, are old and non-standard with confusing crossroad connections and short on- and off-ramps. In the Kingman district, the I-40-U.S. 93 south interchange requires modernization. U.S. 93 north in Kingman is currently reached indirectly from I-40, via a signalized intersection and city streets. U.S. 93 is being upgraded from two to four lanes for most of its length. As this process moves forward, a system interchange with I-40 will likely be needed to handle the increased traffic volumes.

The CS team will identify existing mainline and ramp deficiencies with respect to ADOT and AASHTO highway design standards for horizontal and vertical curvature, shoulder width, structures, merge distances and other design elements. CS has developed an interchange analysis tool for South Carolina that uses methods based on HERS-ST, the Highway Capacity Manual, and other sources to generate a complete evaluation of interchanges. We propose to develop a sketch planning tool for the I-40 Profile that could be expanded in the future for a more complete evaluation of highway interchanges across the state. The tool will include a database of information on interchanges on I-40 and an analytical capability that examines the performance of each interchange currently and in the future and evaluate multiple factors (such as travel time and safety).

Report Needs and Deficiencies

The existing and future transportation conditions analysis prepared in Task 3 will be linked to the adapted HERS-ST, deficiency thresholds, and evaluation framework elements to identify the transportation system needs and deficiencies for the I-40 Profile. Future needs and deficiencies will be prepared for both 2015 and 2030. We will use the GIS to prepare maps and data describing deficiencies and needs in the study area and associated data describing the specific issues on focus routes in the study area. Presentation and graphical material will be prepared to support Working Paper 2 and the public and stakeholder involvement events to be implemented in Task 4.

Subtasks

- 3.1 Develop an overall evaluation approach built on HERS-ST AZ that provides a complete analysis of state highway needs and deficiencies, addressing preservation, roadway capacity expansion, interchanges, curves or grades, and other issues;
- 3.2 Implement an approach to consider the entire state transportation system in the study area including all non-highway modes; and
- 3.3 Report needs and deficiencies along the I-40 corridor.

Products

- Working Paper 2, Needs and Deficiencies Along the I-40 Corridor in 2015 and 2030.

Task 4. Public and Stakeholder Involvement Round I

Objective

Establish and conduct a public and stakeholder involvement plan that maximizes the participation of local residents, elected officials, businesses, and agency stakeholders and that educates, informs, and solicits feedback from participants for use in the planning process.

Approach

Public and Stakeholder Involvement Plan

As part of Task 1, the CS team will develop a detailed Public and Stakeholder Involvement Plan. Intrinsic will draw on its experience creating plans for numerous public involvement efforts in Northern Arizona, and will work closely with CS and ADOT to develop an effective and well-articulated plan. Development of the plan will occur in concert with the other efforts of the CS team. The plan will identify diverse groups of stakeholders and outline objectives and methods to gain meaningful public input and involvement in the study. The emphasis will be on assuring a broad and inclusive outreach effort, gaining useful input, and thoroughly documenting both the process and public comments on all issues.

Communications Plan

To ensure that the outreach effort connects with members of the public and stakeholders, the CS team will create a detailed contact database, drawing upon ongoing and recently completed ADOT studies in the corridor and Intrinsic's existing databases developed on projects in Northern Arizona. Intrinsic's contacts and knowledge, especially with the Indian communities along I-40, will provide for the most accurate and productive distribution of project information.

Our team's knowledge and working relationships with media throughout the study area will be employed to provide the type of local relevancy that will engage segments of the local populations that may not respond to standard public notices. All media contact will be approved by the ADOT project manager and coordinated with ADOT's Office of Communication and Community Partnerships to ensure a consistent message. Press releases will be drafted for major events, such as open houses and the CS team will follow up with phone calls to encourage timely and informative media coverage.

The CS team will work with ADOT to develop material for the ADOT website, including summary information about the project and study documents in PDF format. The web site provides a means to disseminate project information easily and to a wide audience.

A variety of efficient and cost effective methods will be utilized to broaden the public and stakeholder outreach, including adding information about the ADOT project to existing newsletters, web sites, e-mail lists, mailing lists, and publications accessible through our relationships with various groups. Intrinsic has contacts with Indian tribes, local jurisdictions, community groups, major area employers, and other groups in the study area. Word-of-mouth communications through these types of groups can greatly increase local participation in the public meetings. Outreach will also be accomplished through the involvement of TAC members' and connections to their constituencies.

Stakeholder Meetings

The CS team will hold an initial set of stakeholder meetings designed to assess key issues along the I-40 corridor. These meetings will include transportation agencies, local and regional governments, major transportation providers, economic development agencies, and others organizations with knowledge of key issues in the study area. These meetings will include presentation of existing and future conditions as developed in Task 2 and will provide an opportunity for knowledgeable stakeholders to identify key issues for the deficiency and project prioritization analyses. Stakeholder meeting participants will be encouraged to participate in future rounds of public involvement.

Given the importance of I-40 as a goods movement corridor, the CS team recommends that a specific stakeholder meeting be held with representatives of freight related industries. This would include trucking firms, warehouse and distribution industries, the BNSF railroad, and other freight related businesses. CS has extensive experience working with trucking and freight related industries, including conducting interviews with these firms in Arizona to support the Arizona Department of Commerce Trade and Logistics Study.

A final set of meetings will be identified through coordination with the ADOT project manager and TAC. Stakeholder meetings will likely be conducted regionally, given the length of the corridor.

Public Open Houses

A first set of public open house meetings will be held in conjunction with Task 3. These meetings will use information developed from the stakeholder meetings and the existing and future conditions (Task 2) and needs and deficiency (Task 3) analyses. The meetings provide an opportunity to provide information to the public and receive feedback on key issues.

A study newsletter will be produced prior to the first open house. This newsletter will provide a clear and concise overview of the study, identify study tasks and current progress, and provide information about upcoming public involvement events. The CS team will work with ADOT to include all pertinent information and graphics. The newsletter will be distributed ahead of meetings to the relevant groups identified as part of the communication plan. Both print and electronic versions of the newsletters will be available to help maximize the reach of each issue.

At the open house meetings, information will be conveyed through a variety of clear and comprehensive exhibits and handouts. Newsletters will be distributed, and members of the public will be able to discuss issues one-on-one with CS and ADOT team members. Although similar types of information will be presented and solicited throughout the study area, it is important to reach out to the diverse populations encompassed in the study area. Concerns and issues for the more rural portions of the study area will naturally be different from those around the incorporated cities. Preferences for means of input may vary as well. The best way to be effective and remain consistent from meeting to meeting is to provide a variety of options to communicate at each meeting. Methods for input could include questionnaires, verbal discussions with notes taken by team members, and graphic displays and maps. The use of large pads for written comments can help promote the exchange of ideas, even though participants may be attending the meeting at different times.

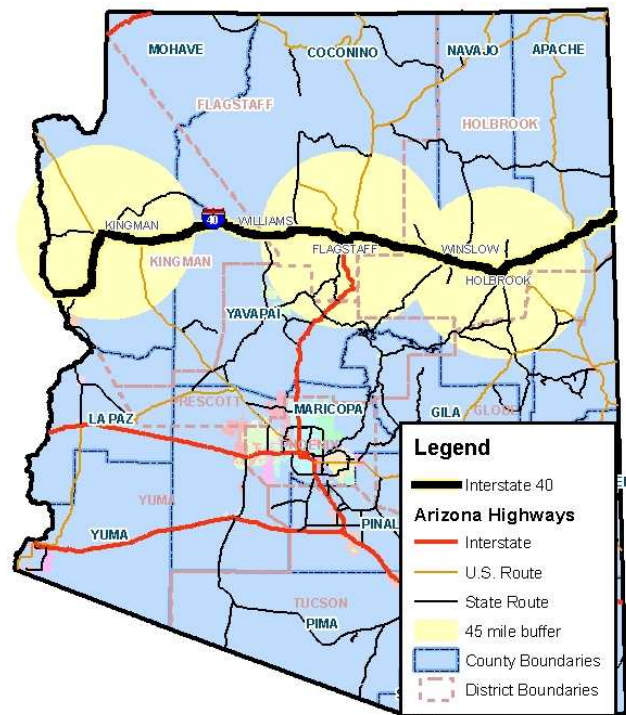
The CS team recommends that up to four open houses be held along the corridor. Three of these should be held in the incorporated cities of Kingman, Flagstaff, and Holbrook. Figure 1.5 presents a 45-mile buffer around each of these three cities. Two areas may not be well covered by these three locations – one to the West, between Kingman and Williams (Williams is well within the Flagstaff area, but should be considered as an alternate location for one of the rounds of public involvement), and another in the far east part of the corridor. This eastern part of the corridor crosses the Navajo Indian Reservation. To reach out to this community, a fourth open house is recommended for the unincorporated community of Sanders. Final selection of locations will be made in coordination with the ADOT project manager and the TAC.

Sites will be easily accessible both geographically and in accordance with the Americans with Disabilities Act. All sites will be chosen to facilitate the free movement of members of the public and CS team members, which is vitally important in an open house format. The sites will be comfortable and well-lighted to provide the best atmosphere for conveying information about the project. Intrinsic will provide two meeting facilitators at each meeting, including a native Navajo speaker. Special accommodations for other means of communication will be made available if requested.

Subtasks

- 4.1 Based on the detailed public and stakeholder involvement plan prepared in Task 1, prepare supporting plan elements including stakeholder mailing lists and databases, scheduling of events, media coverage plans, and refinements of methods to gain meaningful public input and involvement in the study.
- 4.2 Conduct stakeholder meetings with key agencies and organizations in the study area, including a meeting focused on trucking and freight interests.
- 4.3 Prepare an I-40 Profile newsletter using a format and distribution process approved by ADOT. Newsletters will be user friendly, graphically oriented, and will convey summary information to the public and stakeholders.
- 4.4 Conduct up to four public open houses in conjunction with Task 3, providing multiple methods to collect information from participants.
- 4.5 Prepare the associated media and press material for each round of public involvement.

Figure 1.5 Open House Coverage for Proposed Cities



Products

- Summary Report 1 documenting the first round of public meetings, media coverage, mailing lists, and all stakeholder and public comments and responses; and
- Electronic version of the contact database.

Task 5. Develop a Program of Prioritized Projects

Objective

Identify potential projects for the I-40 Profile and develop a structured evaluation framework and related criteria linked to the needs and deficiency analysis and public involvement process to test the viability of proposed projects.

Approach

One of the key results of the I-40 Profile will be potential projects for consideration in future statewide planning and programming. The Profile represents a first step in a planning process that includes developing a long-range transportation plan, programming, and project delivery. The I-40 Profile will produce a list of potential projects that have been prioritized within the study region. These projects will then be evaluated across the State as part of an update to the state long-range transportation plan. We believe that it is vital that the Profiles follow the general performance-based planning guidelines developed in MoveAZ and the Profile Guidelines, including developing corridor level projects (or project bundles), developing thorough cost estimates for these projects, using performance measures to evaluate these projects, and developing a prioritized program of projects that reflects State concerns.

Identify Potential Projects

Potential transportation options will be identified for the I-40 corridor, and for intersecting or parallel routes that may be needed to support the overall development of the corridor. Using the sources noted below, as well as additional information gathered through the course of the study, we will develop a detailed assessment of available options that will include highway, multimodal, and freight infrastructure improvements.

- **HERS-ST AZ.** In addition to identifying deficiencies, HERS-ST suggests potential projects to remedy deficient conditions. HERS-ST can identify these projects using cost effectiveness criteria (e.g., projects with a benefit/cost ratio greater than one) or conduct a full engineering needs analysis that identifies all projects required to eliminate deficient roadways.
- **District Engineers.** In previous corridor profiles, ADOT district engineers played a key role in identifying projects. It will be very important to continue the district engineer's role in these efforts as they have the most information about local conditions. We propose to provide the district engineers with formatted output from HERS-ST and other tools to ensure that potential projects meet a basic standard of reasonableness.
- **Alternate strategies.** The CS team will consider alternate strategies, including preservation, interchange, operational multimodal, and related strategies identified by tools developed in Task 3. The CS team will also consider congestion management strategies identified as part of previous work conducted for ADOT.

- **Public involvement suggestions.** The public open houses provide an opportunity for the public and stakeholders to engage planning concepts and potential options identified by ADOT and the consultant team and to suggest key concepts of their own.

Using the process developed as part of MoveAZ, these individual project elements will be bundled into larger corridor-level projects that capture potential long-term investments. The bundling process ensures that the tools capture the performance impacts of projects in the study area. The process uses a set of decision guidelines and will include review of project bundles by key knowledgeable staff, especially the District Engineers.

Develop Cost Estimates

To support the prioritization and cost-effectiveness assessments of projects, it is important to develop thorough and complete cost estimates. Though the Profiles are planning studies, we believe that it is important that the cost estimates be as thorough and accurate as possible. Several of the tools used for the I-40 Profile provide rough cost estimates of major investments. For example, IDAS includes costs of major ITS deployments, and HERS-ST AZ includes cost information for a wide variety of highway investments. These cost templates will be updated with local information, based on recently completed work by ADOT in the study area. The cost estimates will reflect variation in conditions, such as terrain, and will be estimated separately for key components, such as construction, right-of-way, and other related costs. DMJM Harris will be responsible for developing these costs based on sound engineering judgment. These estimates will reflect the variety of conditions, such as terrain, and cover all key components of project costs including construction, right-of-way, and others. District engineers will have an opportunity to review these costs during the project identification process.

Develop and Apply Evaluation Framework

The CS team will develop a performance-based evaluation framework that uses HERS-ST AZ as its base, but includes other tools and procedures to help ADOT capture the wide range of activities that affect the state highway system. This key sketch planning and related tools to be used as part of this process include:

- HERS-ST forms the basis of the evaluation approach. HERS-ST includes multiple performance measures and estimates the costs and benefits of potential projects. Major planning factors addressed by HERS-ST include mobility, safety, reliability, cost effectiveness, environmental protection, and others.
- ADOT management systems will provide a key additional set of tools for preservation issues, as well as safety. Two major systems can be used to estimate the benefits of pavement and bridge rehabilitation and replacement strategies. ADOT also has a safety management system that will evaluate the benefit of key systemwide projects, such as improved guard rail treatments.
- The proposed interchange sketch planning tool will help identify cost-effective solutions to outdated interchanges along I-40.
- The analysis of travel demand will help ADOT understand how particular travel markets (local trip, long-haul freight, and long-distance auto) may respond identify the response of particular markets to solutions.

- IDAS provides both a set of ITS and operational strategies, as well as evaluations of specific ITS deployments. IDAS can be used as a stand alone tool, or pieces of IDAS can be used to support HERS-ST and travel modeling tools.
- GIS provides a means to calculate spatial attributes and evaluate the impacts of investments on certain population groups in the study area. Key issues that can be evaluated include access to jobs, connection to the national highway system or other major facility for growing population areas, and others.

A final set of evaluation tools will be selected through consultation with ADOT and the I-40 Profile TAC.

The evaluation framework will be consistent with the performance-based planning direction set by MoveAZ and the Profile Guidelines. We propose to develop an evaluation system that compares potential projects to a future base system performance scenario for both 2015 and 2030. For the I-40 Profile, these future scenarios will reflect expected investments along the I-40 corridor region, traffic volumes appropriate to the particular year, and will include all state highways in the study area. Some of the key issues to be addressed in the evaluation framework, consistent with MoveAZ, include:

- **Mobility and Reliability.** The CS team will analyze potential impacts to delay and incident delay that result from the projects. These measures can be captured by HERS-ST and supplemented, if necessary, by tools such as IDAS and an interchange analysis tool.
- **Accessibility.** The CS team will identify expected improvements to access the state transportation system and measure the impact of potential projects on Title VI populations. These issues could include analysis of changes in heavy truck trips, improved access to employment, and other similar analyses. HPMS data, socioeconomic data, and a GIS-based analysis can be used to identify these impacts.
- **Economic Vitality.** The CS team will analyze the cost effectiveness and economic benefits of each project. HERS-ST is an economic analysis tool, estimating the dollar value of user, crash, and pollution costs. In addition, economic analysis of freight traffic will be a key component of this analysis.
- **Preservation.** The CS team will identify both the short- and long-term preservation benefits of strategies. ADOT's existing management systems can identify short-term (five year) benefits of repaving and bridge maintenance. As ADOT migrates to Pontis over the next several years, longer-term benefits of bridge maintenance can be identified. Long-term pavement impacts can be identified from local estimates of average pavement life and replacement costs.
- **Safety.** The CS team will evaluate the impacts of new facilities on the safety of the transportation system. We will use HERS-ST to identify expected changes to crash rates, injuries, and fatalities on state highways in the study area. These will be calibrated to actual crash rates along the I-40 corridor.
- **Resource Conservation.** The CS team will evaluate the impacts of projects on environmental issues, including pollution costs and, potentially, emissions rates. HERS-ST estimates pollution costs. Other tools, such as Mobile 6 and IDAS can be used to estimate emission rate impacts.

The evaluation will produce a matrix of projects by performance measures and factors identified in the evaluation approach. The matrix will include performance results, cost estimates, and other information.

Develop a Prioritized Program for the I-40 Corridor

The CS team will work with ADOT to build the individual project evaluations into a draft prioritized program of projects for the I-40 Profile. This program will include all strategies, projects, and program investments identified throughout the study.

Subtasks

- 5.1 Identify candidate projects based on existing databases of strategies, and tools, district engineer review, and public and stakeholder suggestions.
- 5.2 Develop a method for developing consistent and accurate cost estimates for all projects in the study area.
- 5.3 Identify key sketch planning analysis tools to evaluate highway, operations, preservation, interchange, and alternate mode projects in the region. HERS-ST AZ will be the primary tool, but will be supplemented by other tools as appropriate to the issues along the I-40 corridor.
- 5.4 Develop and apply performance measures using the tools identified to compare the system performance of potential investments to future base scenarios for both 2015 and 2030.
- 5.5 Identify a priority list of projects with all of their components and costs by major type of road.

Products

- Working Paper 3, I-40 Profile Program of Prioritized Projects.

Task 6. Public and Stakeholder Involvement Round II

Objective

Conduct a second round of public involvement that maximizes the participation of local residents, elected officials, businesses, and agency stakeholders and that educates, informs, and solicits feedback from participants for use in the planning process.

Approach

Public Involvement Meetings

A second set of public open house meetings will be held in conjunction with Task 5. These meetings will build on the first round of public involvement and will present the evaluation framework and potential projects identified in Task 5. This round of public involvement will provide an opportunity to draw a clear connection from existing and future conditions to identification of deficiencies to identification and evaluation of potential projects.

At the open house meetings, information will be conveyed through a variety of clear and comprehensive exhibits and handouts. A second newsletter will be created for this round of public involvement and distributed both prior to and at the open houses. Again, the CS Team will

provide a variety of options to communicate information about the study, and provide choices for how each individual would like to provide input. These could include questionnaires, verbal discussions, large pads for written comments, comment cards, and graphic displays and maps. The events will present information describing how input from the first round was incorporated into the study to shape the project's development.

As described in Task 4, appropriate locations for the open house meetings will be identified in conjunction with the ADOT project manager and the TAC. We believe that four sites should be included in the second round of open houses, including one site on the Navajo reservation.

Intrinsic will provide two staff members at each meeting, including a native Navajo speaker. The availability of special accommodations for other means of communication will be made clear in the press release and provided when requested.

Subtasks

- 6.1 Prepare a second I-40 Profile newsletter using a format and distribution process approved by ADOT;
- 6.2 Conduct up to four public open houses in conjunction with Task 5, providing multiple methods to collect information from participants; and
- 6.3 Prepare the associated media and press material for the second round of public involvement.

Products

- Summary Report 2 documenting the second round of public and stakeholder involvement.

Task 7. Final Draft Report

Objective

Prepare the Final Draft Report that synthesizes the technical analysis, partnering events, and products generated during the course of the study. An Executive Summary will also be provided in a format agreed upon by ADOT.

Approach

The CS team will prepare the Final Draft Report by integrating the results of Working Papers 1, 2, and 3, and the summary reports for both rounds of the public and stakeholder involvement process. These outputs will form the core of the Final Draft Report and include detailed information about the evaluation framework; existing and future conditions; needs and deficiencies analysis; public and stakeholder input on issues and project options; recommended project priorities and strategies; and recommended future planning, engineering, and environmental analysis needs. An Executive Summary and presentation material that further distills the information contained in the Draft Report also will be prepared for the public, stakeholders, agency staff, and the State Transportation Board.

Based on our experience with previous ADOT studies and similar studies in other states, we will prepare the Final Draft Report early enough in the schedule to allow for sufficient time for review and comment by ADOT and the TAC. This schedule will allow ample opportunity for

ADOT and the TAC to provide thorough and thoughtful comments on the Final Draft Report before finalization.

Subtasks

- 7.1 Work with ADOT and the TAC to determine and finalize the format of the Draft and Final Reports and Executive Summary; and
- 7.2 Prepare and submit both the Draft Report and Draft Executive Summary to ADOT and the TAC for their review and comment.

Products

- Final Draft Report and Executive Summary for ADOT and the TAC.

Task 8. Final Report

Objective

Prepare the Final Report, taking into account all comments received on the Final Draft Report.

Approach

The CS team will work with ADOT and the TAC to incorporate the appropriate level of comments generated in this review and comment period to prepare the Final Report and associated Final Executive Summary. We will provide specific responses to all comments generated by the TAC and ADOT management to ensure that all issues and concerns are fully addressed. We will provide ADOT with a Board presentation that represents the study findings, recommendations, and future transportation analysis needs.

The CS team will prepare PDF and electronic versions of the Final Report, as well as all supporting working papers, memoranda, and information for transfer to ADOT. The Final Report and applicable technical memoranda and material also will be posted on the web site.

Subtasks

- 8.1 Upon receipt of ADOT's and the TAC's review and comment, prepare the Final Report; and
- 8.2 Prepare Draft and Final Report presentation material for ADOT to present the study's findings and recommendations to the State Transportation Board.

Products

- Forty copies of the Final Report and Executive Summary for ADOT and the TAC;
- Electronic, camera ready copy of the Final Report and Executive Summary;
- Web-ready versions (in PDF format) of each Final document by task; and
- Board presentation material for the Final Report.